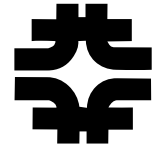


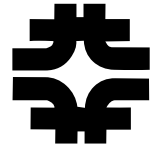
Accelerator Program Overview

Steve Holmes

Fermilab

March 16, 2004

Outline

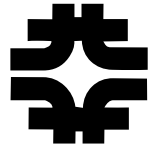


- Role, Mission, and Responsibilities
- Program, Current and Future
- Resources
- Programmatic Risks
- Planning and Priorities

Role

- The Associate Director for Accelerators provides line management oversight for the Accelerator and Technical Divisions
- Role of the Associate Directors:
  - Establish laboratory goals (within the Directorate)
  - Establish Division goals in concert with laboratory goals (and in consultation with the Division Heads)
  - Assign resources in the Divisions sufficient to achieve goals
  - Assist the Divisions in achieving goals
  - Advocate for the Divisions within the Directorate
  - Advocate for Directorate within the Divisions
  - External communications

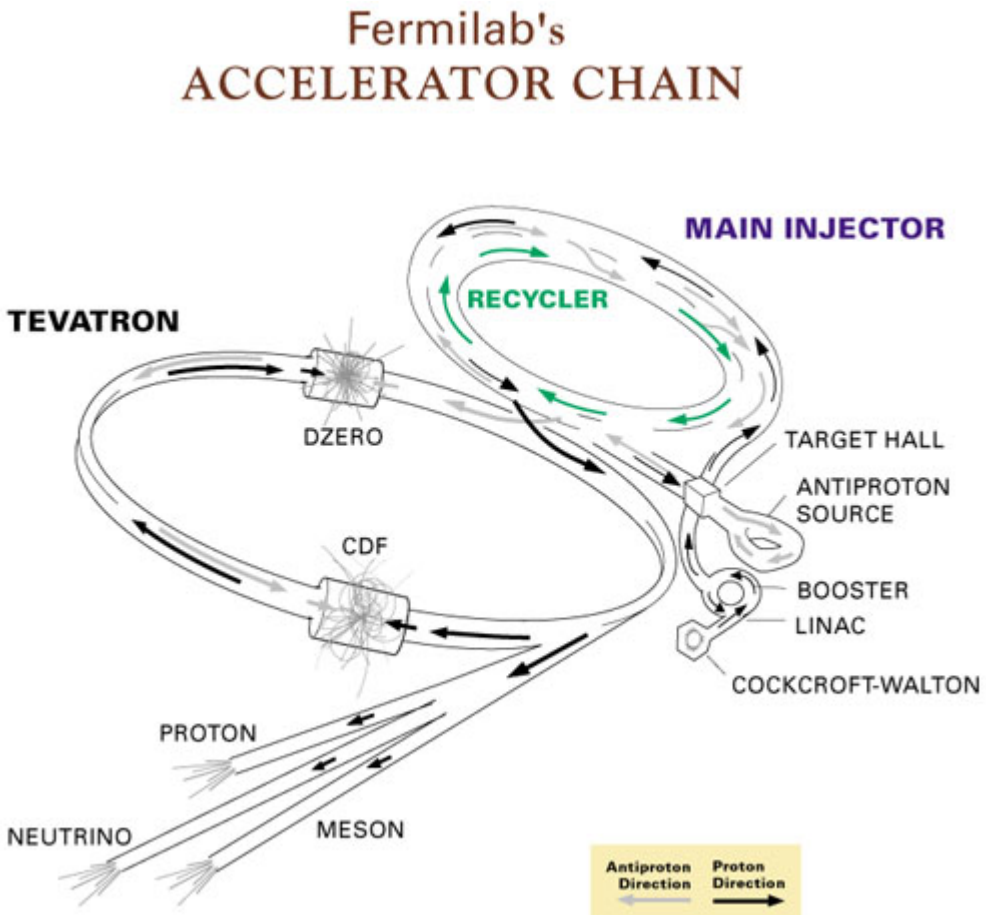
Mission



- The missions of the Accelerator and Technical Divisions include:
  - Maintenance and operation of the accelerator complex in support of the HEP research program.
  - Improvement of accelerator performance to meet established goals.
  - R&D in accelerator technologies aimed at next generation HEP facilities and beyond
  - Construction of new accelerator facilities
  - Technical component fabrication, magnet measurement, and machine shop support of laboratory projects

Mission

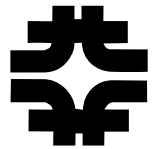
- 7 miles of accelerators
- 5 miles of beamlines
- 800 people
- 44 weeks of operation a year (nominal)
- 2.0 TeV proton-antiproton collisions



Responsibilities

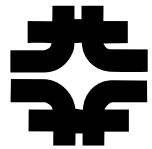
- Associate Director
  - The Associate Director holds oversight responsibility for successful execution of the Accelerator and Technical Division missions
    - A close working relationship with the division heads is essential
- Division Heads
  - The Division Heads are responsible for successful execution of their missions
    - Deployment of resources are controlled at the division level
      - (Note: The AD for Accelerators directly controls only one account, budgeted at <$100K)

Programs in Support of the Present Mission



- Run II Collider Program
  - Operations, maintenance, and upgrades
- MiniBoone beam operations
- 120 GeV test beam and experiment operations
- NuMI construction project
- BTev IR design
- LHC accelerator construction project
- Future accelerator R&D
  - Linear collider
  - Proton Driver
  - Superconducting magnet
  - Advanced accelerator (photoinjector lab)
  - Muon facilities

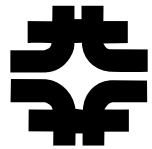
Programs in Support of the Future Mission



- Run II Collider Program
- MiniBoone beam operations
- NuMI/MINOS beam operations
- 120 GeV test beam and experiment operations
- BTev construction and operations
- Future accelerators
  - Linear collider R&D (and construction?)
  - Proton Driver R&D (and construction?)
  - LHC accelerator research program
  - Superconducting magnet R&D
  - Advanced accelerator R&D
  - Muon facilities R&D

} coupled

Resources in Support of the Mission



- Staff
  - Accelerator Division = 580
  - Technical Division = 230
  - The planned program for the coming decade requires maintenance at this level
- Budgets

Accelerator Division =	$95,276M
Technical Division =	$26,498M
Sum =	$121,774M

Resources in Support of the Mission/AD Budget

Table 1: FY04 budget by major activities

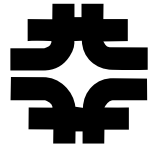
DS - ACCELERATOR DIVISION	Labor	M&S	total
Run 2			
Accelerator Operation	35,562.0	11,847.0	47,409.0
Accelerator Improvement	6,542.0	14,039.0	20,581.0
Detector Operation	0.0	0.0	0.0
Detector Improvement	0.0	0.0	0.0
Non-Run 2			
Accelerator Operation	3,515.0	2,049.0	5,564.0
Accelerator Improvement	0.0	0.0	0.0
Detector Operation	0.0	0.0	0.0
Detector Improvement	0.0	0.0	0.0
Others			
LHC	0.0	0.0	0.0
Non-accelerator physics	0.0	0.0	0.0
Theory	0.0	0.0	0.0
Physics Research	0.0	0.0	0.0
NuMI Line Item	1,484.0	9,880.0	11,364.0
Future Accelerator R&D	462.0	1,010.0	1,472.0
Future Detector R&D	0.0	15.0	15.0
Direct	6,313.0	2,558.0	8,871.0
Indirect	0.0	0.0	0.0
Total	53,878.0	41,398.0	95,276.0

Resources in Support of the Mission/TD Budget

Table 1: FY04 budget by major activities

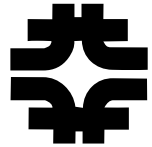
DS - TECHNICAL DIVISION	Labor	M&S	total
Run 2			
Accelerator Operation	3,194.7	570.0	3,764.7
Accelerator Improvement	1,960.0	70.0	2,030.0
Detector Operation	0.0	0.0	0.0
Detector Improvement	0.0	0.0	0.0
Non-Run 2			
Accelerator Operation	15.0	0.0	15.0
Accelerator Improvement	0.0	0.0	0.0
Detector Operation	0.0	0.0	0.0
Detector Improvement	0.0	0.0	0.0
Others			
LHC	2,038.8	376.0	2,414.8
Non-accelerator physics	711.7	3,089.0	3,800.7
Theory	0.0	0.0	0.0
Physics Research	0.0	0.0	0.0
NuMI Line Item	0.0	0.0	0.0
Future Accelerator R&D	4,569.3	2,625.0	7,194.3
Future Detector R&D	816.0	0.0	816.0
Direct	4,455.1	2,007.0	6,462.1
Indirect	0.0	0.0	0.0
Total	17,760.6	8,737.0	26,497.6

Programmatic Risks



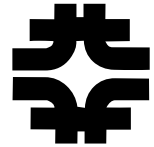
- Accelerator Operations:
  - The existing accelerator complex is being counted on to support operations at or beyond the highest performance levels in history, through at least 2012.
  - Risk elements
    - Reliability of aging accelerators
      - Linac and Booster are the most serious
    - Technical challenges in the Run II Upgrades
      - Electron cooling
      - Stack-tail upgrade
      - Etc.

Programmatic Risks



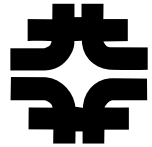
- Accelerator Operations:
  - Risk elements (cont)
    - Proton demand for Run II+MiniBoone+NuMI
      - Requires at least doubling the current throughput of the Linac and Booster
      - Pressure to operate MiniBoone in parallel with NuMI
    - Institutional knowledge base
      - With people carrying years of accumulated knowledge nearing retirement

Programmatic Risks



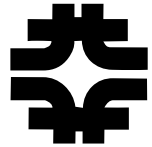
- Mitigation
  - Reliability
    - Formally assigned to the Accelerator Division Associate Head for Engineering
    - Stockpiling of spares
    - Potential need for a linac front end replacement ($30-50M) looms on the horizon
  - Technical challenges in the Run II Upgrades
    - Complete mockup of electron cooling facility in Wideband Lab prior to Recycler installation
    - Complete simulation of the stack-tail upgrade, benchmarked against machine studies

Programmatic Risks



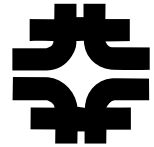
- Mitigation (cont)
  - Proton demand
    - “Proton Plan” in preparation
      - Similar in spirit and approach to the Run II Upgrade Plan
  - Institutional knowledge base
    - Target critical areas as preferred hiring areas
      - rf and high power engineering, accelerator scientists…
    - Discussing creation of an engineering fellowship program modeled after Wilson and Peoples Fellows

Programmatic Risks



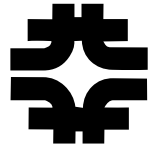
- Current Projects (NuMI and LHC Accelerator)
  - No unusual risks beyond those typically associated with construction projects: completion of a defined technical scope, on time and on budget.
- Future Projects and Facilities
  - Allocation of sufficient resources to achieve goals.
  - Mitigation
    - Capture roll-off of NuMI and Run II Upgrade resources
    - Establish plan for the future consistent with anticipated resources

Planning and Priorities



- Philosophy
  - In general, the need to set priorities is a reflection that resources are not matched to goals.
    - Prioritization should not be viewed as a substitute for good planning.
    - It is much better to establish plans that match resources with goals, and then execute the plan!
- However, this is not the world we operate in.
  - Projects take many years to complete
  - Anticipated funding levels can fail to materialize
  - Unanticipated conditions can cause one to fall short of the plan and/or require resources beyond those originally anticipated.

Planning



- The Directorate has responsibility for setting the direction of the laboratory.
  - Advice, communication, and input from critical stakeholders is essential.
    - Users, AD and TD Heads, DOE, HEP community, accelerator physics community are major stakeholders from accelerator point of view.
  - The primary advice mechanisms are:
    - Physics Advisory Committee
    - Accelerator Advisory Committee
    - Scientific Advisory Group (internal)

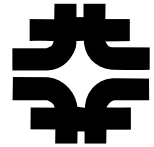
Planning

- Accelerator Advisory Committee Membership

J-P. Koutchouk/CERN
S. Kurokawa/KEK
S. Milton/ANL
M. Minty/DESY
S. Peggs/BNL
J. Rogers/Cornell
T. Roser/BNL (chair)
L. Rossi/CERN
R. Ruth/SLAC
A. Zholents/LBNL

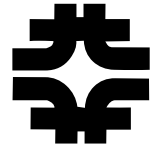
Meets twice annually

Managing the Plan



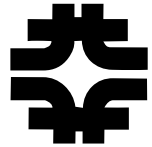
- Once a plan is established it has to be communicated and managed
  - The primary management and communications mechanisms are:
    - Run II Program Management Group
    - Weekly Users' Meeting
    - Weekly Scientific Directors Meeting
    - Weekly AD/TD meeting
    - Biweekly teleconference with DOE
    - Peer review mechanisms
    - Director's, DOE, and internal reviews

Priorities



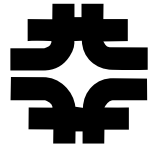
- Setting priorities
  - Establishing priorities is part of managing the plan.
  - The same mechanisms described above are used for setting priorities once resources and the plan get out of alignment.

Priorities



- The current view of the priorities for AD and TD are:
  - Run II operations
  - Run II upgrades
  - NuMI and LHC construction projects
  - MiniBoone operations
  - BTev planning
  - Linear Collider and Proton Driver R&D
  - Everything else

Summary



- The Accelerator and Technical Division missions are critical to the laboratory's present and future.
- Managing the myriad activities with the resources available in these organizations is a challenge.
- So far we are meeting the challenge, but it is hard to envision things getting any easier.
- Details from Roger and Bob